

ABSTRACT OF THE DISCLOSURE

A transparent lens substrate includes a first end and a second end, which are on opposite sides of the lens substrate.

5 The second end is inclined with respect to the first end. Microlenses are formed on the lens substrate to be located either inside or outside the first end. Each microlens has an optical axis. The optical axis of each microlens intersects the first end and the second end of the lens substrate at a

10 first intersection and a second intersection. The distance between the first and second intersections defines a substrate thickness, and the substrate thickness varies depending on each microlens.